TETRA TECH

January 26, 2017

Mr. Reed Miner
Montana Department of Environmental Quality
Petroleum Tank Cleanup Section
655 Timberwolf Parkway, Suite 3
Kalispell, Montana 59901-1215

Subject: Additional Corrective Action and Work Plan (CAP AC-07)
Minuteman Aviation, 5225 Highway 10 West, Missoula, Montana
DEQ Facility ID# 32-02040, Release #2139, Work Plan 10395

Dear Mr. Miner:

Tetra Tech is pleased to submit this Corrective Action and Work Plan (CAP) for activities at the Minuteman Aviation facility in Missoula, Montana (**Figure 1;** Attachment A). This additional CAP is intended to fulfill the requirements of the DEQ, as set forth in their letter dated September 6, 2016, *Additional Corrective Action and Work Plan Required for Petroleum Release at Minuteman Aviation Facility* and several modifications requested by the DEQ during project discussions in December 2016 and January 2017.

The following sections provide our proposed scope of work and proposed time schedule. Referenced figures are presented in Attachment A. An estimated budget for completing the work tasks is included as Attachment B.

SCOPE OF WORK

In order to meet the requirements of the DEQ for this release, Tetra Tech proposes the following four tasks:

Task 1 – Corrective Action Plan (CAP) Preparation and HASP Preparation

Activities associated with the preparation of this CAP are included in Task 1. These activities include correspondence with our client, the DEQ and the Petroleum Tank Release Compensation Board (PTRCB).

In order to comply with Occupation Safety and Health Administration Code of Federal Regulations (CFR) 29 1910.120, Tetra Tech routinely prepares a Health and Safety Plan (HASP) for projects that involve field investigation activities, especially for those projects where environmental contaminants may be encountered. All work at the site will be conducted under an existing HASP which will be revised to include proposed work outlined in this document.

Task 2 – Borehole Drilling and Monitoring Well Installation

Tetra Tech proposes to drill up to fifteen borings at the site and complete up to twelve of those borings as groundwater monitoring wells at the locations indicated on **Figure 2**. Our project budget includes two optional monitoring wells north of the site if field

Tetra Tech
2525 Palmer St, Suite 2
Missoula, Montana 59808
Tel 406.543.3045 Fax 406.543.3088 www.tetratech.com

screening information indicates they are warranted in order to define the downgradient extent impacts.

Tetra Tech will coordinate buried utility locates using a one-call locating service prior to initiating intrusive activities. Tetra Tech will also discuss the proposed locations with representatives of the Missoula County Airport Authority knowledgeable about private utilities in the area. Borehole locations may be adjusted in the field due to buried utility locations.

The borings will be installed using a truck-mounted hollow-stem auger drill rig. The three borings located within the paved potion of Aviation Way (Figure 2) will be advanced to a maximum depth of 10 feet below grade. Soil samples will be obtained from each borehole beginning at 5 feet below grade and collected at 5-foot intervals thereafter using a split-spoon sampler that will be decontaminated between samples. Sampling activities will cease upon encountering the groundwater interface. Lithologic units encountered and visual and olfactory indications of petroleum hydrocarbon impacts will be recorded on logs completed for each borehole. A portion of each sample will be analyzed in the field for volatile organic compounds (VOCs) in headspace vapor using a calibrated photoionization detector (PID) following Tetra Tech's headspace screening method (on file with the DEQ). Headspace screening results will be recorded on borehole lithologic logs. Drill cuttings generated during drilling operations will be thin spread in an unpaved area of the site.

The three boreholes will be backfilled with drill cuttings and an approximately 2-foot thick layer of granular bentonite in the upper portion of the boring. The upper 6 inches of the boring will be capped with asphaltic patch material.

Up to twelve borings will be drilled at the site and completed as groundwater monitoring wells constructed using two-inch diameter, flush threaded polyvinyl chloride (PVC) well casing. Up to seven of the wells will be completed at approximately 20 feet below grade and used to monitor impacts to the near surface groundwater. Solid "blank" PVC will be installed from the top of the screened interval to approximately 6 inches below grade.

Shallow monitoring wells will include a 15-foot section of slotted PVC well casing. Solid "blank" PVC will be installed from the top of the screened interval to approximately 6 inches below grade. Inert silica sand will be placed in the annular space surrounding the well casing to approximately two feet above the top of the screened interval. The well will be sealed with hydrated, granular bentonite, placed directly above the sand pack. A locking well plug (a.k.a. "j-plug") will be placed in each well casing, and a common-keyed padlock will be installed on each j-plug. Steel well casing protectors with bolt-on lids will be grouted in place and finished flush with the surrounding surface. The top, north quadrant of each well casing will be marked with indelible ink to serve as the measuring point reference mark for future groundwater monitoring activities.

Up to five wells will be completed at approximately 43 feet below grade and used to monitor potential impacts coincident with the completion depth of well MW-3. These deep monitoring wells will include a 10-foot section of factory-slotted (0.020-inch) PVC well screen placed in the base of the boring and completed as described above.

Following well completion, each well will be developed using a new disposable bailer and surge and bail technique. Development will continue until the clarity of the evacuated water improves or until a minimum of 5 gallons of water is removed. Evacuated water will be thin spread on the surface next to the well.

Up to two soil samples per borehole will be submitted to Eurofins Laboratories (Eurofins) in Lancaster, Pennsylvania for laboratory analysis of volatile petroleum hydrocarbons (VPH) and extractable petroleum hydrocarbons (EPH) screen in accordance with DEQ guidelines. Soil samples exhibiting total extractable hydrocarbons (TEH) concentrations exceeding 200 milligrams per kilograms (mg/Kg) will be further analyzed for EPH fractions. The sample from each borehole exhibiting the highest headspace concentration and the sample obtained from the air/groundwater will be submitted for laboratory analyses. In the event that field screening results do not indicate petroleum hydrocarbon impacts, then only the sample from the air/groundwater interface will be submitted for laboratory analysis. For purposes of estimating costs, we assume 25% of the soil samples will require EPH fractionation. Eurofins was chosen to conduct laboratory analyses for this project because 1) a local laboratory is not present in the area of the site and 2) Tetra Tech secured preferential pricing from Eurofins that offsets the cost for overnight delivery charges.

The elevations of the existing monitoring well network (MW-1 through MW-5; **Figure 2**) was surveyed into an arbitrary datum. Tetra Tech will contract with a licensed professional surveyor to survey the locations and depth to water measuring point elevations of the existing wells and the newly installed wells to a standard datum in accordance with State of Montana regulations. Tetra Tech will also coordinate submitting completion logs for the new monitoring wells to the Montana Bureau of Mines and Geology, Ground-Water Information Center (GWIC).

Task 3 – Groundwater Monitoring

Groundwater monitoring will be conducted on a semi-annual frequency for a period of one year following installation and development of the new monitoring well. Groundwater monitoring observations and field data will be recorded on field forms.

Depth to water measurements will be obtained during each monitoring event from the five existing monitoring wells (MW-1 through MW-5; **Figure 2**) and the newly installed monitoring wells using a decontaminated electric well probe. Groundwater elevation data will be used to interpret groundwater flow direction and gradient at the site.

Groundwater samples will be obtained during each monitoring event from wells MW-3, MW-4 and the newly installed monitoring wells. If possible, approximately three bore volumes of water will be evacuated from each well using a peristaltic pump and new disposable tubing. Evacuated water will be dispersed on ground surface proximate to each well. Field parameters will be measured periodically through the evacuation process. IBI parameters will include dissolved oxygen (DO), temperature, pH, specific conductance (SC), and oxidation/reduction potential (ORP) and will be measured using electronic probes in an open vessel. Evacuation will continue until parameters for the

individual wells stabilize. In the event the well is purged dry, the well will be allowed to recover prior to sample collection.

Following parameters stabilization, groundwater samples will be obtained from each of the three wells using vessels provided by the laboratory and preserved in accordance with the analytical method requirements. The sample vessels will be labeled, placed in coolers with ice, and shipped to Eurofins for VPH and EPH screen analyses in accordance with DEQ guidelines. Samples exhibiting TEH concentrations exceeding 1,000 micrograms per liter (µg/L) will be further analyzed for EPH fractions. For purposes of estimating costs, we assume 25% of the groundwater samples obtained during each event will require EPH fractionation.

Task 4 – Project Management and Report Preparation

Following soil boring and well installation activities and completion of the first semi-annual groundwater monitoring event, Tetra Tech will prepare an *Abbreviated Soil Boring and Monitoring Well Installation Report* (AR-03). The report will include a map showing all historical soil borings and monitoring wells, cumulative soil data and pending infrastructure. The report will also provide our opinion on the extent of impacted soil at the site.

Upon completing the second semi-annual groundwater monitoring event, Tetra Tech will prepare an *Abbreviated Generic Application Report* (AR-07) summarizing the results of the second semi-annual monitoring event. The report will meet the data requirements of an *Abbreviated Report Form for Groundwater Monitoring at a Petroleum Release Site* (AR-01) and include a Cleanup Alternatives Matrix evaluating potential remedial options for the site including closure with a petroleum mixing zone.

SCHEDULE

Field work will be schedule following receipt of approval from the DEQ and the PTRCB Borehole drilling and well installation will monitoring well installation will be completed in late winter/early spring 2017. The first semi-annual groundwater monitoring event is anticipated to be completed during spring 2017 and coincide with seasonally high groundwater elevations. The second semi-annual groundwater monitoring event will be completed approximately 6 months later and coincide with seasonally low groundwater elevations.

The turnaround time for laboratory analytical results of soil and groundwater samples is typically three weeks. The report will be prepared and submitted within 15 business days following our receipt of final laboratory data.

FEE

The estimated cost to complete the proposed scope of work is provided in **Attachment B**. Tetra Tech requested bids from three bids from qualified drilling contractors, however only two bids (O'Keefe Drilling and Boland Drilling) were received by the time this work plan was submitted.

Unit rates are based on the fiscal year 2017 fee schedule approved by the PTRCB. If the DEQ require additional activities at the site, the project budget may require modification. However, no additional work will be completed without prior authorization from the MCAA.

A copy of this work plan was also submitted to the PTRCB for their review and approval. If you have any questions regarding this project, please contact me at your earliest convenience at (406) 543-3045.

Respectfully Submitted:
Tetra Tech

Jerold A. Armstrong, L.G.
Project Manager

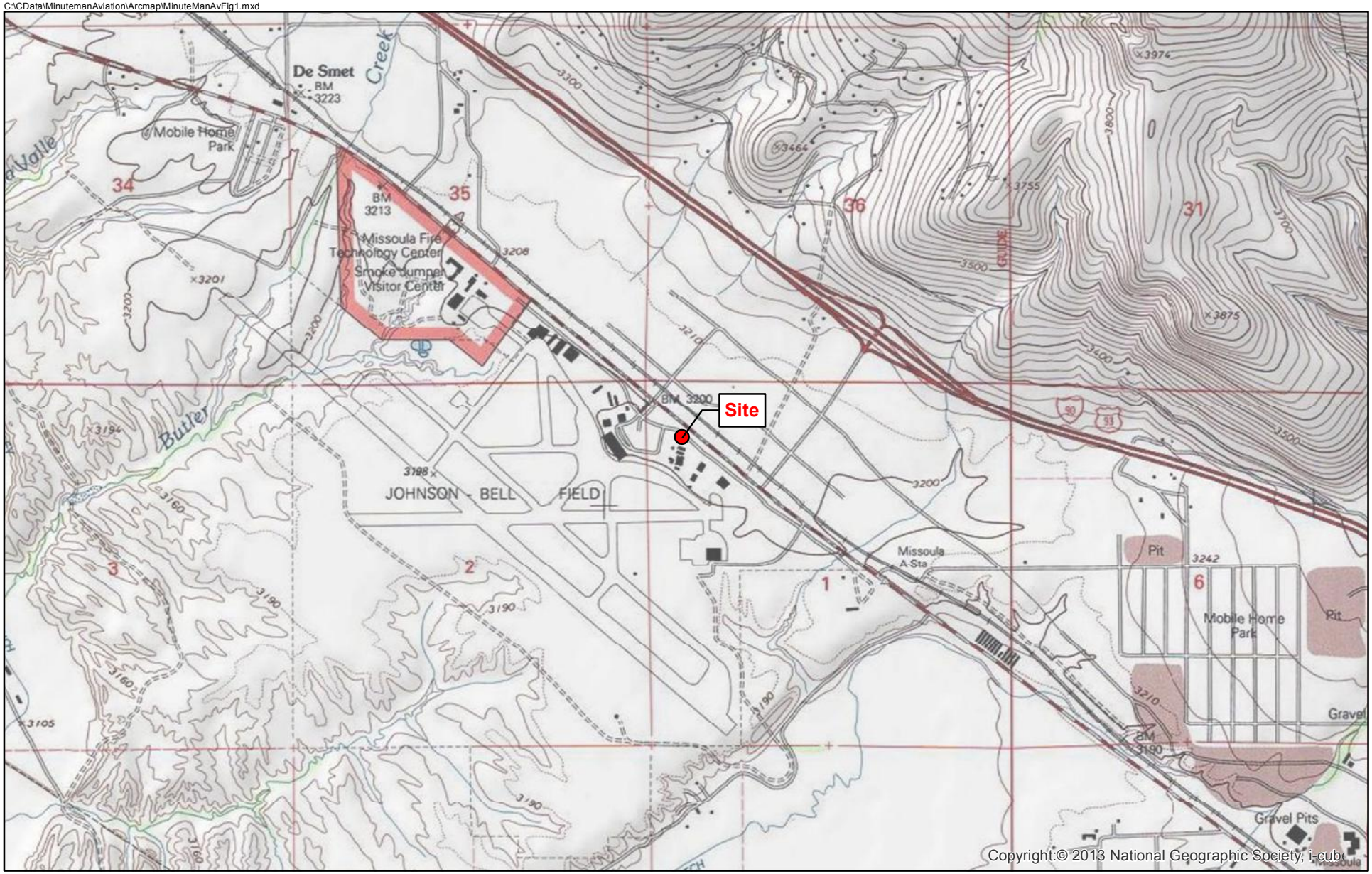
Attachments: A – Figures
B – Cost Estimate

cc w/ Attachments: Mr. Chris Jensen, Missoula County Airport Authority, Missoula, MT
Mr. Jerry Mamuzich, Minuteman Aviation
Mr. Shaun Shea, Morrison-Maierle, Missoula, MT
Ms. Ann Root, PTRCB, Helena, MT

ATTACHMENT A

Figures

C:\CData\MinutemanAviation\Arcmap\MinuteManAvFig1.mxd



N

SCALE IN FEET

0 1,000

Location Map
Minuteman Aviation
Missoula Montana

Figure 1

C:\CData\MinutemanAviation\Arcmap\MinuteManAvFig2.mxd

SCALE IN FEET
0 50

- Monitoring Well
- Shallow Well TD ~ 20' Screen 5' - 20'
- Deep Well TD ~ 43' Screen 33' - 43'
- Soil Boring TD ~ 10'
- Former UST Location

Proposed Well and Boring Location Map
Minuteman Aviation
Missoula Montana
Figure 2

ATTACHMENT B

Cost Estimate and Drilling Contractor Bids

COST ESTIMATE

ADDITIONAL CORRECTIVE ACTION AND WORK PLAN

Minuteman Aviation, Missoula

DEQ Facility ID# 32-02040, Release #2139, Work Plan 10396

January 2017

TASK NO. 1: CORRECTIVE ACTION PLAN (CAP)& HASP PREPARATION

	RATE	UNITS	COST
Corrective Action Plan (CAP_AC-07)	$1,500.00	1	$1,500.00
Project Scientist (HASP prep)	$118.82	6	$712.92
			$2,212.92
		TOTAL TASK 1	**$2,212.92**

TASK 2: BOREHOLE DRILLING AND MONITORING WELL INSTALLATION

	RATE	UNITS	COST
Labor			
Project Scientist (utility locates, MDT permits, drilling oversight, etc)	$118.82	54	$6,416.28
Other Direct Costs			
Drilling Subcontractor (Cost +7%)	$24,400.00	1	$24,400.00
Licensed Surveyor (Cost +7%)	$2,355.00	1	$2,355.00
VPH (soil), per sample	$58.00	24	$1,392.00
EPH Screen(soil), per sample	$40.00	24	$960.00
EPH Fractionation (soil), per sample	$128.00	6	$768.00
Miscellaneous (decon materials, disposable bailers, PPE, etc)	$200.00	1	$200.00
Shipping, estimate	$150.00	4	$600.00
		TOTAL TASK 2	**$37,091.28**

TASK 3: SEMI-ANNUAL GROUNDWATER MONITORTING (2 Events)

	RATE	UNITS	COST
Groundwater Sampling, per well (MW-3, MW-4 and 12 New Wells)	$175.00	28	$4,900.00
Water Level Measurements, per well (MW-1, MW-2 and MW-5)	$40.00	6	$240.00
VPH (groundwater), per sample	$58.00	28	$1,624.00
EPH Screen (groundwater), per sample	$40.00	28	$1,120.00
EPH Fractionation (groundwater), per sample	$128.00	7	$896.00
Groundwater Sampling Fee, per well	$10.00	28	$280.00
Shipping, estimate	$150.00	8	$1,200.00
		TOTAL TASK 3	**$10,260.00**

TASK NO. 4: PROJECT MANAGEMENT AND REPORTING

	RATE	UNITS	COST
Sr. Project Manager, per hr	$132.49	20	$2,649.80
Abbrev. Soil Boring & Monitoring Well Install Rpt (AR-03)	$2,455.00	1	$2,455.00
Abbrev Gen. App Rpt w/ Cleanup Alt Matrix (AR-07), Sr Proj Manager, per hr	$132.49	4	$529.96
Abbrev Gen. App Rpt w/ Cleanup Alt Matrix (AR-07), Proj Scientist, per hr	$118.82	24	$2,851.68
Abbrev Gen. App Rpt w/ Cleanup Alt Matrix (AR-07) CADD per hr	$83.43	2	$166.86
Abbrev Gen. App Rpt w/ Cleanup Alt Matrix (AR-07) Word Processor/hr	$64.71	2	$129.42
Abbrev Gen. App Rpt w/ Cleanup Alt Matrix (AR-07) B&W copies/page	$0.10	200	$20.00
Abbrev Gen. App Rpt w/ Cleanup Alt Matrix (AR-07) Color 11x17 copies/page	$1.75	16	$28.00
		TOTAL TASK 4	**$8,830.72**
		TOTAL ESTIMATED COST	**$58,394.92**

O'KEEFE DRILLING
Environmental
P.O. Box 3810 - Butte, MT 59702
Office: (406) 494-3310 Fax: (406) 494-3301
Email: info@okeefedrilling.com

Client:	Tetra Tech	Date:	11-Jan-17
Attention:	Jerry Armstrong	Phone:	406-543-3045
Project:	Missoula Airport	Fax:	
	Minuteman Aviation-Petrofund		

PROJECT SPECIFICATIONS:

Type of Rig:	Mobile B-61 Auger	**Number of Borings:**	3
Location:	Missoula Airport	**Expected Footage:**	10
Formation:	Sands Gravels	**Number of Wells:**	5
Sampling:	Yes, Every 5'	**Expected Footage:**	43
Decontamination:	Yes	**Screen Length:**	10
Other Details:	Flushmounts	**Completion PVC Size:**	2
		Number of Wells:	7
		Expected Footage:	20
		Screen Length:	15
		Completion PVC Size:	2

Soil Boring/Monitoring Well Installation

Unit Cost Worksheet

	Task		Unit Cost		Number of Units	Total Cost
Mobilization/Demobilization						
	Drill Rig	$	2.00	Miles	240	$ 480.00
	Support Vehicle w/decon trailer	$	1.75	Miles	240	$ 420.00
	Interm Travel	$	1.50	Miles		$ -
Per Diem	*Crew Members*					
	Motel	2	$ 80.00	Per Person Per Day	4	$ 640.00
	Food	2	$ 35.00	Per Person Per Day	5	$ 350.00
Soil Boring Installation						
8.75	Drilling 0-50 ft range	$	24.00	Per Foot	385	$ 9,240.00
Monitor Well Installation -						
2"	Drilling 0-50 ft range	$	26.00	Per Foot	355	$ 9,230.00
Drilling Standby & Safety Meeting						
	Prior Approval Needed	$	105.00	Per Hour		$ -
Other:						
	DOT Drums	$	85.00	Each	22	$ 1,870.00
	Containerize Cuttings	$	170.00	Per Hour	2	$ 340.00
	Decon	$	170.00	Per Hour	1	$ 170.00
			Total Project Expenses			**$ 22,740.00**

**Client is responsible to remove Drums from the work site.

***Client is responsible for any line locates. Locate number can then me given to O'Keefe Drilling who then will request a ticket default.

****This bid is subject to change as warranted when the addition of prior unexpressed need for additional certifications, medical monitoring, sampling, containerization or other unforeseen change in the scope of work.

Petroleum Tank Release Compensation Board

Soil Boring/Monitoring Well Installation Unit Cost Worksheet

Contractor Information

Company Name: Boland Drilling

Address: 4701 N Star Blvd

City, State, Zip: Great Falls, MT 59405

Cost Estimator: Chris Boland

Phone: 406-761-1063

Signature: Chris Boland

1/18/2017

Project Information and Specifications

Minuteman Aviation

Address:

Missoula

Facility ID #

Release #

WP ID #

Type of Drilling Equipment

Hollow-Stem Augers	x
Air Rotary	
Direct Push	
Other (please specify)	

Soil Boring

Number of Borings	15
Boring Diameter (inches)	8
Depth (per boring - ft)	10'-43'

Surface: Concrete Asphalt Barren

Soil Disposal: Onsite Stockpile Drums

Abandonment: Bentonite Soil Cuttings

Soil Sampling

Continuous Soil Sampling	
Interval Soil Sampling (specify interval)	
No Sampling	

Monitoring Well Specifications

Number of Wells	12
Surface: Concrete Asphalt Barren	
Depth (per well)	20-43
Estimated Depth to Groundwater (ft)	
Boring Diameter (inches)	8
Casing Diameter and type (inches)	2

Surface Completion: (Flush Mount) Aboveground

Cost Estimate Explanation:

(1) Mobilization/Demobilization: Includes all costs and mileage to transport equipment, materials, and personnel to and from the site location. More than one mobilization event of either the drilling rig or support vehicle will require justification and pre-approval by the DEQ-PRS and Board staffs. This item should be estimated on a per mile unit rate

(2) Soil Boring Installation: Includes all costs (labor, equipment, and materials) to drill, collect soil samples and abandon soil borings, as well as decontaminate equipment. Drilling costs should be estimated using a per foot unit rate. Unit cost should include handling of contaminated soil by stockpiling or placing in drums. Assume level "C" personal protective equipment.

(3) Monitoring Well Installation: Includes all costs (labor, equipment, and materials) to drill, collect soil samples, and complete monitoring well to specifications and according to Montana Well Drillers Board rules, as well as decontaminate equipment. Drilling costs should be estimated using a per foot unit rate. Unit cost should include handling of contaminated soil by stockpiling or placing in drums. Assume level "C" personal protective equipment.

(4) Drilling Standy: Drilling standby should be estimated on an hourly basis. Prior approval and justification for accumulating standby time is needed prior to billing.

(5) Well Development: Includes all costs (labor, equipment, and materials) to develop monitoring wells. This task should be estimated using a per well unit rate.

(6) Monitoring Well Abandonment: Includes all costs (labor, equipment, and materials) to properly abandon a well location according to the Montana Well Drillers Board rules. Abandonment costs should be estimated using a per well unit rate.

Soil Boring/Monitoring Well Installation Unit Cost Worksheet

TASK		UNIT COST		NUMBER OF UNITS	TOTAL COST
Mobilization/Demobilization (1)					
Mobilization/Demobilization: Drilling Rig	$	2.00	/mile	350	$ 700.00
Mobilization/Demobilization: Support Vehicle	$	1.50	/mile	350	$ 525.00
Soil Boring Installation (2)					
Drilling (0'-50' range per boring)	$	26.00	/foot	385	$ 10,010.00
Drilling (50'-100' range per boring)			/foot		$ -
Other (please specify) _____					$ -
Monitoring Well Installation (3)					
Drilling (0'-50' range per well)	$	26.00	/foot	355	$ 9,230.00
Drilling (50'-100' range per well)			/foot		$ -
Other (please specify) _____					$ -
Drilling Standby (4)					
-prior approval needed	$	125.00	/hour	0	$ -
Well Development (5)					
Well Development	$	160.00	/well	0	$ -
Monitoring Well Abandonment (6)					
Abandonment	$	275.00	/well		$ -
Lodging may only be paid at actual costs when documented by receipts.					
Per Diem					
Lodging: number of individuals =	2	$	105.00	/person per day	4	$ 840.00
Food: number of individuals =	2	$	23.00	/person per day	4	$ 184.00
(Breakfast 5.00, Lunch 6.00, Dinner 12.00)						
				TOTAL PROJECT EXPENSE		**$ 21,489.00**

D.O.T. Drums $95.00

Additional Conditions/Comments/Costs:

Drill up to 15 soil boring and construct up to 12 monitor wells at Minuteman Aviation in Missoula, MT

If you require assistance, call 406-841-5090.

Submit completed form to:

Petroleum Tank Release Compensation Board PO Box 200902, Helena MT 59620-0902